

Report on the FCC and IC Testing of the
EagleBurgmann Germany GmbH & Co. KG

Model: EB-SSS-BM

In accordance with FCC 47 CFR Part 15 B
and ICES-003

Prepared for: EagleBurgmann Germany GmbH & Co. KG
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Germany



Product Service

Add value.
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COMMERCIAL-IN-CONFIDENCE

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Alexander Deese	2025-05-26	 SIGN-ID 1047633
Authorised Signatory	Martin Steindl	2025-05-26	 SIGN-ID 1047658

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures described on test pages.
All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15 B and ICES-003.

The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Alexander Deese	2025-05-26	 SIGN-ID 1047633

Laboratory Accreditation DAkS Reg. No. D-PL-11321-11-03 DAkS Reg. No. D-PL-11321-11-04	Laboratory recognition Registration No. BNetzA-CAB-16/21-15	Industry Canada test site registration 3050A-2
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Executive Statement:

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15 B:2023 and ICES003:2020

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1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Revision	Description of changes	Date of Issue
0	First Issue	2025-05-26

Table 1: Report of Modifications

1.2 Introduction

Applicant	EagleBurgmann Germany GmbH & Co. KG
Manufacturer	EagleBurgmann Germany GmbH & Co. KG
Model Number(s)	EB-SSS-BM
Serial Number(s)	a6409c0105e18000
Hardware Version(s)	0202
Software Version(s)	---
Number of Samples Tested	1
Test Specification(s) /	FCC 47 CFR Part 15 B : 2023 and
Issue / Date	ICES-003 : 2020
Test Plan/Issue/Date	---
Order Number	4300107225
Date	2025-03-07
Date of Receipt of EUT	2025-05-16
Start of Test	2025-05-20
Finish of Test	2025-05-20
Name of Engineer(s)	Alexander Deese
Related Document(s)	ANSI C63.4: 2014



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15 B and ICES-003 is shown below.

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
---	15.107	Conducted Disturbance at Mains Terminal	N/A
2.1	15.109	Radiated Disturbance	Pass

Table 2: Results according to FCC 47 CFR Part 15 B

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
---	6.1	AC Power Line Conducted Emissions	N/A
2.1	6.2	Radiated Emissions	Pass

Table 3: Results according to ICES-003

N/A: Not applicable



1.4 Product Information

1.4.1 Technical Description

EB Smart Seal Sensor with Thread

Frequency Band:	2400.0 MHz – 2483.5 MHz
Supply Voltage:	2.0 V – 3.3 V, Battery supplied
Supply Frequency:	DC
Highest clock frequency (radio part):	2480 MHz
Highest clock frequency (non-radio part):	---



Type plate



EUT



Gateway



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1.5 Test Configuration

The EUT was 3V / DC battery supplied.

1.6 Modes of Operation

The EUT was connected to a Gateway via Thread.

1.7 Deviations from Standard



1.8 EUT Modifications Record

The table below details modifications made to the EUT during the test program.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.9 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
Configuration according to 1.5 and 1.6	
Radiated Disturbance	Alexander Deese

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Radiated Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15 B, Clause 15.109
ICES-003, Clause 6.2

2.1.2 Equipment under Test and Modification State

EB-SSS-BM; S/N a6409c0105e18000; Modification state 0

2.1.3 Date of Test

2025-05-20

2.1.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	38 %



2.1.5 Specification Limits

On any frequency below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidth. As an alternative to CISPR quasi-peak measurements compliance may be demonstrated with the emission limits using measuring equipment employing a peak detector function as long as the same bandwidth as indicated for CISPR quasi-peak measurements are employed.

Above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit. This peak limit applies to the total peak emission level radiated by the device.

Required Specification Limits (Class A)		
Frequency Range (MHz)	Field strength in 10 m distance	
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
30 – 88	90	39
88 – 216	150	43.5
216 – 960	210	46.4
above 960	300	49.5

Table 5 Class A emission limits according to FCC 47 CFR Part 15 B

Required Specification Limits (Class B)		
Frequency Range (MHz)	Field strength in 3 m distance	
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
30 – 88	100	40
88 – 216	150	43.5
216 – 960	200	46
above 960	500	54

Table 6 Class B emission limits according to FCC 47 CFR Part 15 B



<i>Required Specification Limits (Class A)</i>	
<i>Frequency Range (MHz)</i>	<i>Field strength in 10 m distance (dBμV/m)</i>
30 – 88	40
88 – 216	43.5
216 – 230	46.4
230 – 960	47
above 960	49.5

Table 7 Class A emission limits according to ICES-003

<i>Required Specification Limits (Class B)</i>	
<i>Frequency Range (MHz)</i>	<i>Field strength in 3 m distance (dBμV/m)</i>
30 – 88	40
88 – 216	43.5
216 – 230	46
230 – 960	47
above 960	54

Table 8 Class B emission limits according to ICES-003

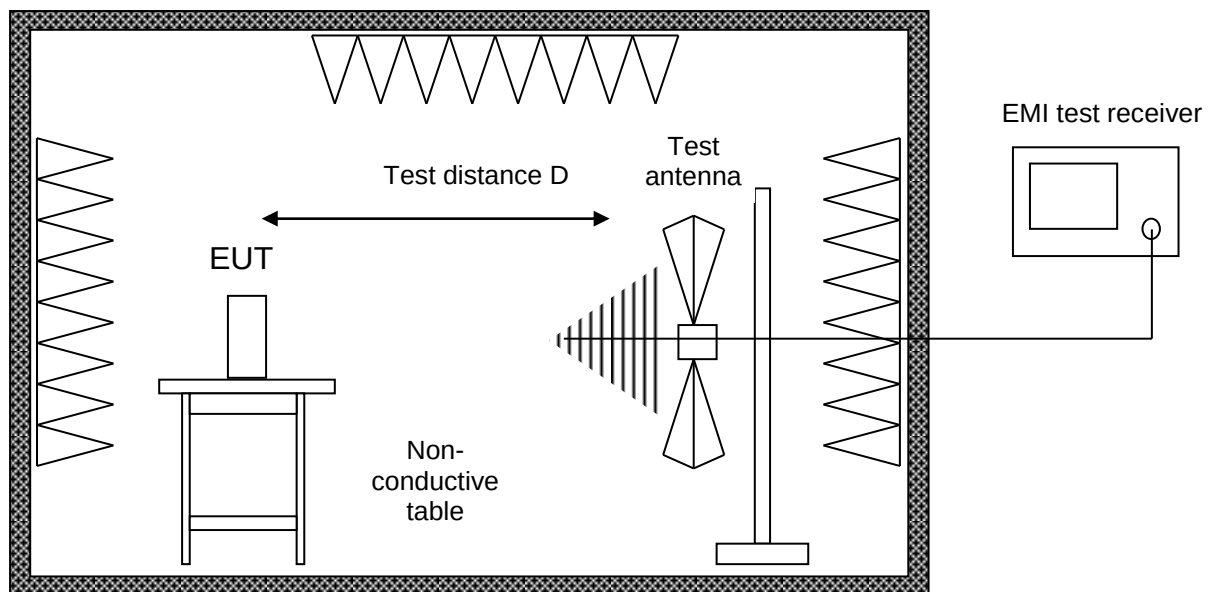
As an alternative to the radiated emission limits shown above, digital devices may be shown comply with the standards contained in the 3rd Edition of CISPR 22. In addition: if measurements must be performed above 1000 MHz, compliance above 1000 MHz shall be demonstrated with the emission limits above. Measurements above 1000 MHz may be performed at the distance specified in the CISPR 22 publications for measurements below 1000 MHz provided the limits above are extrapolated to the new measurement distance using an inverse linear distance extrapolation factor (20 dB/decade), e.g., the radiated limit above 1000 MHz for Class B digital devices is 150 μ V/m as measured at a distance of 10 meters.

2.1.6 Test Method

The test was performed according to ANSI C63.4, sections 5.4, 44 and 8.

The EUT was placed on a non-conductive support 0.1 m above a reference ground plane. Prescans are performed in six positions of the EUT to get the full spectrum of emission caused by the EUT with the measuring antenna raised and lowered from 1 m to 4 m with vertical and horizontal polarisation to find the combination of table position, antenna height and antenna polarisation for the maximum emission levels. Data reduction is applied to these results to select those levels having less margin than 10 dB or exceeding the limit using subranges and limited number of maximums. Further maximisation for adjusting the maximum position is following. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

2.1.6.1 Frequency range 30 MHz – 1 GHz



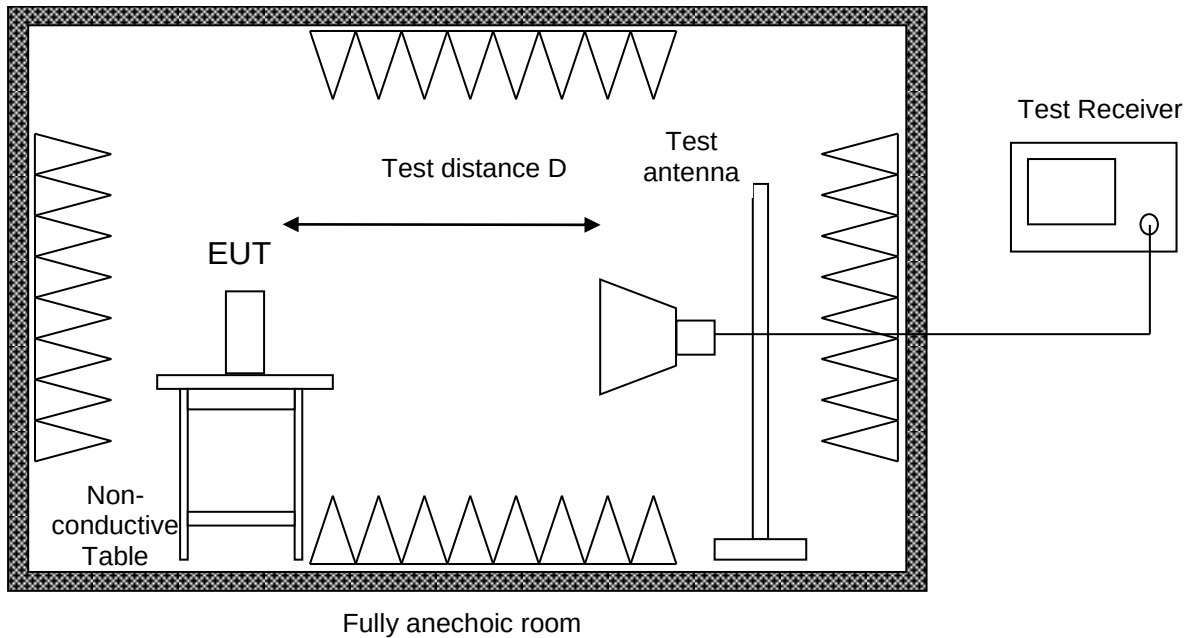
Alternate test site (semi anechoic room)

Radiated emissions in the frequency range 30 MHz – 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4. for alternative test sites. A linear polarised logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna") is used.

For prescan tests the test receiver is set to peak-detector with a bandwidth of 120 kHz.

With the measurement bandwidth of the test receiver set to 120 kHz CISPR quasi-peak detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

2.1.6.2 Frequency range above 1 GHz



Radiated emission tests above 1 GHz are performed in a fully anechoic room complying with the S_{VSWR} requirements of ANSI C63.4. Measurements are performed both in the horizontal and vertical planes of polarisation using a test receiver with the detector function set to peak and average and the resolution bandwidth set to 1 MHz. Testing above 1 GHz is performed with horn antennas with the EUT in boresight of the antenna.

For prescan tests the test receiver is set to peak- and average-detector with a bandwidth of 1 MHz. With the measurement bandwidth of the test receiver set to 1 MHz and peak- and CISPR average-detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.



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2.1.7 Test Results

<i>Frequency range</i>	<i>Limit applied</i>	<i>Test distance</i>
30 MHz – 1 GHz	15.109 Class B, ICES-003 Class B	3 m
1 GHz – 13 GHz	15.109 Class B, ICES-003 Class B	3 m

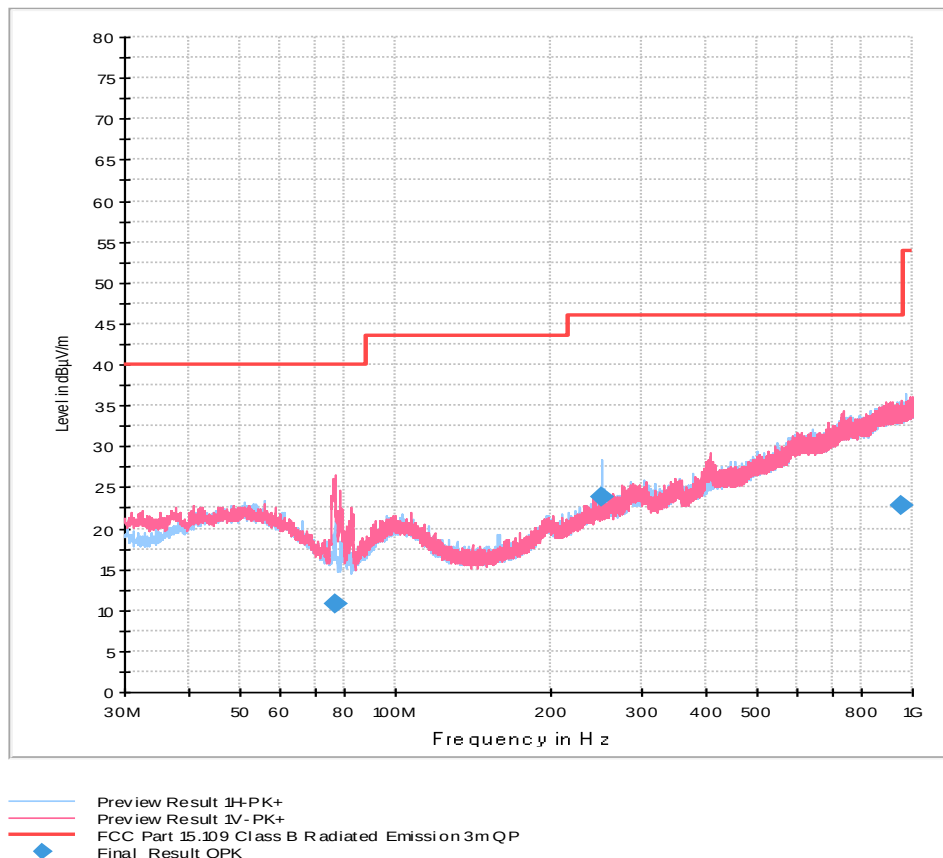
Table 9

Sample calculation:

Final Value (dB μ V/m) = Reading Value (dB μ V) + (Cable attenuation (dB)
+ Antenna Transducer (dB(1/m)))



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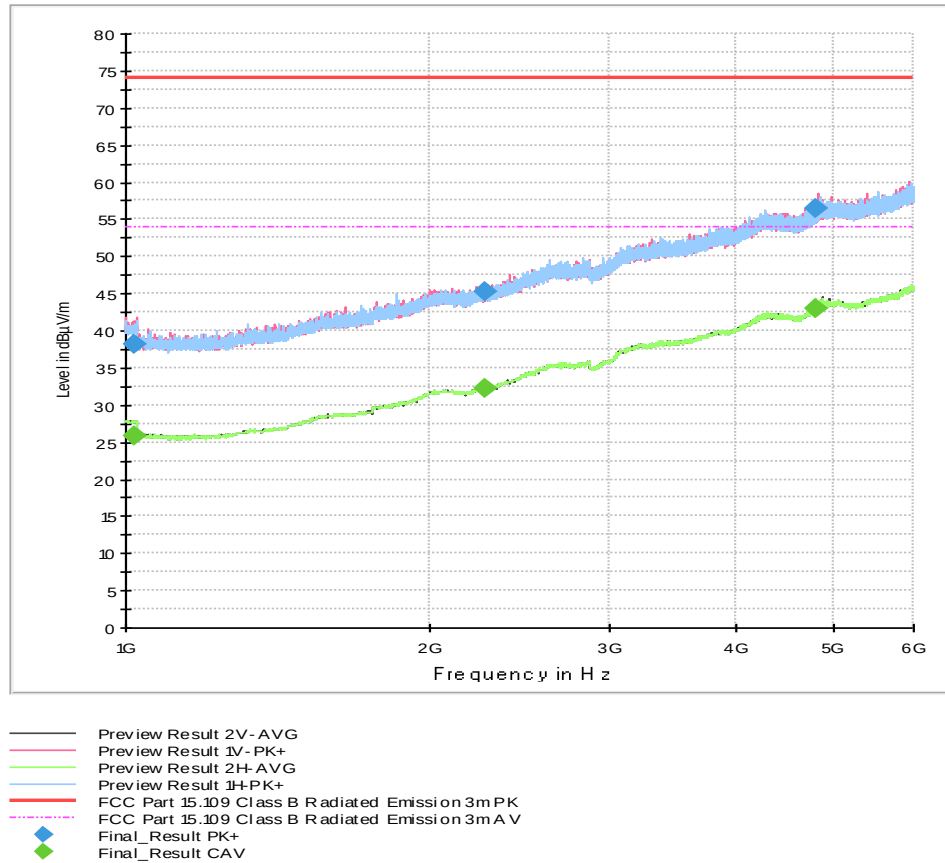


Final Results:

Frequency MHz	QuasiPeak dBμV/m	Limit dBμV/m	Margin dB	Meas. Time ms	Band- width kHz	Height cm	Pol	Azi- muth deg	Corr. dB/m
76.950000	10.87	40.00	29.13	1000.0	120.000	110.0	V	97.0	15.3
249.990000	23.86	46.02	22.16	1000.0	120.000	209.0	H	-112.0	21.5
953.100000	22.79	46.02	23.23	1000.0	120.000	375.0	V	-14.0	32.8



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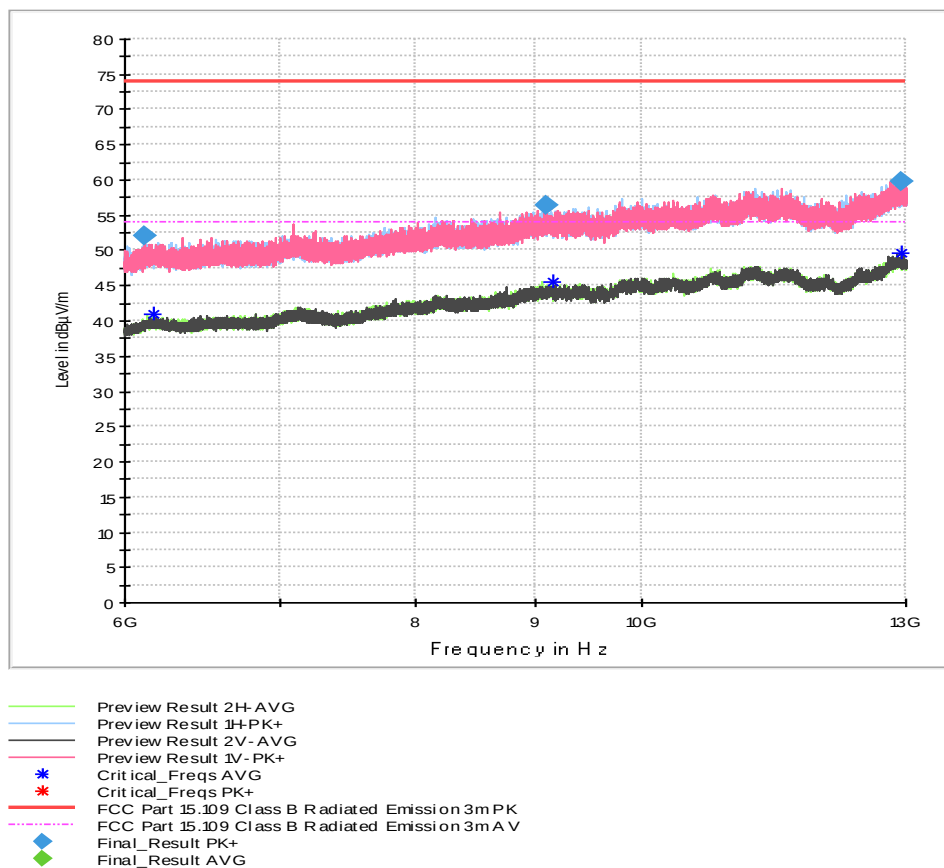


Final Results:

Frequency MHz	Max- Peak dBμV/m	CAver- age dBμV/m	Limit dBμV/m	Mar- gin dB	Meas. Time ms	Band- width kHz	Height cm	Pol	Azi- muth deg	Corr. dB/m
1020.500000	---	25.92	53.98	28.06	1000.0	1000.000	315.0	V	44.0	29.3
1020.500000	38.26	---	73.98	35.72	1000.0	1000.000	315.0	V	44.0	29.3
2263.500000	45.19	---	73.98	28.79	1000.0	1000.000	246.0	V	-65.0	35.1
2263.500000	---	32.16	53.98	21.82	1000.0	1000.000	246.0	V	-65.0	35.1
4816.250000	---	43.02	53.98	10.96	1000.0	1000.000	126.0	V	47.0	43.5
4816.250000	56.41	---	73.98	17.57	1000.0	1000.000	126.0	V	47.0	43.5
6988.000000	65.71	---	73.98	8.27	1000.0	1000.000	305.0	V	-44.0	46.7
6988.000000	---	52.45	53.98	1.53	1000.0	1000.000	305.0	V	-44.0	46.7



Product Service



Final Results:

Frequency MHz	Max- Peak dB μ V/m	Aver- age dB μ V/m	Limit dB μ V/m	Mar- gin dB	Meas. Time ms	Band- width kHz	Height cm	Pol	Azi- muth deg	Corr. dB/m
6117.250000	51.94	---	73.98	22.04	1000.0	1000.000	250.0	V	-150.0	35.8
6167.708333	---	40.90	53.98	13.08	1000.0	1000.000	100.0	H	-150.0	35.7
9102.458333	56.47	---	73.98	17.51	1000.0	1000.000	100.0	V	-30.0	41.0
9168.375000	---	45.60	53.98	8.38	1000.0	1000.000	300.0	H	-150.0	41.0
12934.083333	59.77	---	73.98	14.21	1000.0	1000.000	100.0	H	30.0	44.6
12955.083333	---	49.67	53.98	4.31	1000.0	1000.000	150.0	V	-90.0	44.6



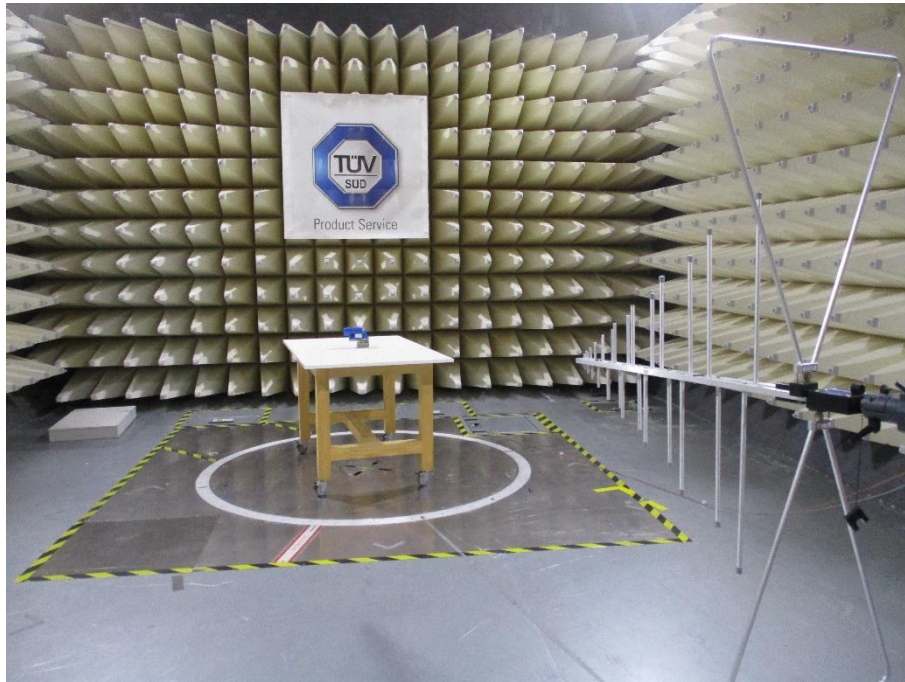
2.1.8 Test Location and Test Equipment

The test was carried out in semi anechoic chamber no. 3:

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
EMI test receiver	Rohde & Schwarz	ESR7	61814	12	2025-06-30
Signal and Spectrum Analyser	Rohde & Schwarz	FSW43	53496	12	2026-04-30
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	19691	36	2027-04-30
Double ridged horn antenna	Rohde & Schwarz	HF907	40089	24	2026-11-30

Table 10

3 Photographs of Test Setups





4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$		

Table 11 Measurement uncertainty based on CISPR 16-4-2

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.